



# Technical Report Series on the Biosystem-Aerosphere Study (BOREAS)

*Editor*

**114**

## Forest Cover Data Layers Format

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## **Technical Report Series on the Boreal Ecosystem-Atmosphere Study (BOREAS)**

*Forrest G. Hall, Editor*

### **Volume 114**

## **SERM Forest Cover Data Layers of the SSA in Vector Format**

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# **SERM Forest Cover Data Layers of the SSA in Vector Format**

Jaime Nickeson, Fern Gruszka

## **Summary**

This data set was prepared by the SERM-FBIU. The data include information on forest parameters and cover the area in and near the BOREAS SSA, excluding the PANP. The data were produced from aerial photography taken as recently as 1988.

Note that several files of this data set on the BOREAS CD-ROMs have been compressed using the Gzip program. See Section 8.2 for details.

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## **1. Data Set Overview**

### **1.1 Data Set Identification**

SERM Forest Cover Data Layers of the SSA in Vector Format

### **1.2 Data Set Introduction**

The forest cover data provided by Saskatchewan Environment and Resource Management, Forestry Branch - Inventory Unit (SERM-FBIU) are basically a digital version of its 1:12,500 scale forest cover polygon maps. As a digital archive, however, changes within forest stands can be updated more readily. At the same time, it should be kept in mind that most of these digital forest cover data were acquired in 1993, and the data set has been static since that time.

### **1.3 Objective/Purpose**

These data are provided as part of the BOREal Ecosystem-Atmosphere Study (BOREAS) Staff Science Geographic Information System (GIS) Data Collection Program, which included the collection of pertinent map data in both hardcopy and digital form. This data set can be used for modeling or for comparison purposes.

## 1.4 Summary of Parameters

There are seven layers of information available for each 10-km x 10-km map unit or tile. The number of layers associated with each tile varies, but in all cases the most important layer for this data set, FPOLY, is always included. The potential data layers are:

FPOLY	polygon layer, full tiles (not filled with lakes) usually have between 1,000 and 1,500 polygons
FLINK	linear features; power line, trails, bridges
DATAP	point information; photo centers, sampling plots
ANNOT	annotation; road and lake names, towns, etc.
SPOLY	special polygons for plotting; sand beaches, reefs
UTMGR	1-km x 1-km grid for Universal Transverse Mercator (UTM) location determination
SHELL	the tile neatline, 10-km x 10-km except on UTM zone boundary tiles

Each of these layers has an associated list of codes or items to help the user decipher the map information. See Section 7.3.

## 1.5 Discussion

The forest cover data provided by SERM-FBIU, is basically a digital version of its 1:12,500-scale forest cover polygon maps. SERM-FBIU maintains a digital data base of the forests in a GIS primarily for use by forest managers for silvicultural purposes.

## 1.6 Related Data Sets

BOREAS Forest Cover Data Layers of the NSA-MSA in Raster Format  
BOREAS Forest Cover Data Layers of the SSA-MSA in Raster Format  
SERM Forest Fire Chronology of Saskatchewan in Vector Format  
SERM Forest Cover Data of Saskatchewan in Vector Format  
Prince Albert National Park Forest Cover Data in Vector Format

# 2. Investigator(s)

## 2.1 Investigator(s) Name and Title

BOREAS Staff Science

## 2.2 Title of Investigation

BOREAS Staff Science GIS Data Collection Program

## 2.3 Contact Information

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### **3. Theory of Measurements**

SERM-FBIU maintains in its inventory unit a GIS of forest inventory information for Saskatchewan forested lands. This inventory is maintained primarily for use by forest managers for silvicultural purposes, and it contains a wealth of information that can be of use in Earth resources analyses and ecosystem modeling.

### **4. Equipment**

#### **4.1 Sensor/Instrument Description**

These data were digitized from 1:12,500-scale forest cover maps. The maps were derived from black-and-white 1:12,500-scale infrared aerial photography and field reconnaissance notes. No information is known about the original digitizing equipment or procedures and criteria used in the digitizing process.

##### **4.1.1 Collection Environment**

These original vector data were acquired as ARC/INFO vector coverages or in ARC/INFO export format. The data were produced by SERM-FBIU. No specific information other than the scale of the resulting photography is known about the aircraft flights or the equipment that was used to collect the aerial photography.

##### **4.1.2 Source/Platform**

Unknown.

##### **4.1.3 Source/Platform Mission Objectives**

Unknown.

##### **4.1.4 Key Variables**

The key variables of this data set are the seven data layers described in Sections 1.4 and 7.3.

##### **4.1.5 Principles of Operation**

Unknown.

##### **4.1.6 Sensor/Instrument Measurement Geometry**

Unknown.

##### **4.1.7 Manufacturer of Sensor/Instrument**

Unknown.

#### **4.2 Calibration**

#### **4.2.1 Specifications**

Unknown.

#### **4.2.1.1 Tolerance**

Unknown.

#### **4.2.2 Frequency of Calibration**

Unknown.

#### **4.2.3 Other Calibration Information**

None.

## **5. Data Acquisition Methods**

SERM personnel created the forest cover maps by transcribing information from aerial photography. Stereographic pairs of black-and-white infrared aerial photographs acquired at a scale of 1:12,500 was interpreted with a stereoscope and used in conjunction with previously mapped data as well as field reconnaissance notes. Timber cruising data, silvicultural data, timber harvesting records, and fire history information may have also been incorporated.

## **6. Observations**

### **6.1 Data Notes**

None.

### **6.2 Field Notes**

The field notes used in compiling the original forest cover data are available from the SERM-FBIU. See Section 2.3.

## **7. Data Description**

### **7.1 Spatial Characteristics**

#### **7.1.1 Spatial Coverage**

This data set covers three geographic blocks of the BOREAS Southern Study Area (SSA), but it excludes the area of Prince Albert National Park (PANP). Multiple map tiles are contained in each geographic block. One map tile covers an area of 10 km x 10 km. The data were acquired on three separate occasions during the course of planning and execution of BOREAS. As a result, there are three geographic blocks of map tiles, one of which overlaps slightly with another. These blocks of data are referred to as Nipawin (or SSA-Modeling Sub-Area (MSA)), North of PANP, and East of PANP. PANP personnel maintain their own forest inventory data base, which is not covered by these data.

Nipawin is the largest block, containing a block of 129 map tiles, 11 in the E-W direction and 12 N-S, as well as encompassing the SSA-MSA. Three tiles at the bottom of the Nipawin block are excluded because they are over an area of agriculture. North of PANP is an area adjacent to and north of PANP, containing a block of 20 map tiles, 4 in the E-W direction and 5 N-S. East of PANP is an area adjacent to and east of PANP, containing a block of 27 map tiles, 4 in the E-W direction and 7 N-S. In addition, this block of data contains one map tile from the south near PANP that contains the Nesbit Forest. This one tile from the south appears to contain only the polygon layer. The East of PANP block duplicates the Nipawin block along its eastern edge.



### 7.1.2 Spatial Coverage Map

The North American Datum of 1927 (NAD27) UTM coordinates of the data blocks within UTM zone 13 are:

Data Block	UTM UL		UTM LR	
	easting	northing	easting	northing
-----	-----	-----	-----	-----
Nipawin	460000	6050000	570000	5930000
North of PANP	390000	6070000	430000	6020000
East of PANP	430000	6000000	470000	5930000

Note that in the coverage files there is a y-shift of 6,000,000 (presumably to save storage space). This means that the y coordinates in the coverages need to have 6,000,000 added to them to get correct UTM coordinates. This shift needs to be handled properly when performing spatial transformations or reprojections of the data. If using ARC/INFO, you may wish to run the PROJECTDEFINE function.

### 7.1.3 Spatial Resolution

The scale of the maps from which these data were digitized was 1:12,500.

### 7.1.4 Projection

The geographic coordinates for the data are given as UTM within zone 13, under NAD27.

### 7.1.5 Grid Description

Not applicable.

## 7.2 Temporal Characteristics

Most of the data used for this product were acquired by BOREAS Information System (BORIS) personnel in 1993. The maps from which the data are derived are completely reinventoried on a 10- to 20-year cycle by SERM, except for disturbed areas, which are updated annually. BORIS acquired the data in 1993; the forest cover layers have not yet had any inventory updates.

### 7.2.1 Temporal Coverage

These data were produced from aerial photography taken as recently as 1988. The data maintained by SERM are updated as needed based on fires, cutting, or other disturbances.

### 7.2.2 Temporal Coverage Map

Not available.

### 7.2.3 Temporal Resolution

As noted, the original maps are completely reinventoried by SERM personnel on a 10- to 20-year cycle, except for disturbed areas, which are updated annually. The photographs and other information used to create the original vector data set most likely covered the 10- to 20-year period prior to 1988 and any updates made from then to 1993, when the data were acquired.

## 7.3 Data Characteristics

### 7.3.1 Parameter/Variable

The data contain polygon and linear features with attributes. Although there are many attributes, the attributes of most interest are probably those in the FPOLY layer and include:

MAP (The 7-digit map )  
FID (A 4-digit stand number)  
OWNER (The stand's ownership code)  
CZONE (The stand's survey zone)  
SOURCE (Source for the stand attributes)

SYR (Source year)  
 SA (Species Association)  
 SP10 (Primary species #1)  
 SP11 (Primary species #2)  
 SP12 (Primary species #3)  
 SP20 (Secondary species #1)  
 SP21 (Secondary species #2)  
 U1 (Understory species #1)  
 U2 (Understory species #2)  
 HGT (Height class code)  
 D (Crown closure code)  
 YOO (Decadal year of stand origin)  
 SP12 (Primary species #3)  
 MLEVEL (Management Level)  
 YSP (Year of silvicultural activity)  
 R1 (Regenerating species #1)  
 R2 (Regenerating species #2)  
 DRAIN (Soil drainage rating)  
 TEXT (Soil texture code)  
 DIST (Disturbance type)  
 DYS (Year of disturbance)  
 NP (Nonproductive stand code)  
 OLDST (Location to retain original 4-digit stand number)

### 7.3.2 Variable Description/Definition

The following is information that is included as files in the data dictionary directory in the archive for the Nipawin and North of PANP archive.

File name: LAYERS.LIST

ANNOT - annotation; roads and lake names, towns, etc.  
 DATAP - point information; photo centers, PSP plots  
 FLINK - linear features; power lines, trails, bridges  
 FPOLY - polygon layer, all of 10-km x 10-km tile falls within a polygon  
 - full tiles usually have between 1,000 to 1,500 polygons in FPOLY  
 SHELL - the tile neatline, 10 km x 10-km except on zone boundary tiles  
 SPOLY - special polygons for plotting; sand beaches, reefs  
 UTMGR - 1-km x 1-km grid for UTM location determination

File name: FPOLY.CODES

Saskatchewan Parks and Renewable Resources Attribute file items

ITEM	COL	ITEM NAME	WIDTH	DESCRIPTION
----	----	-----	-----	-----
1	1	MAP	7	MAP NUMBER
2	8	FID	4	STAND NUMBER
3	12	OWNER	2	OWNERSHIP CODE
4	14	CZONE	3	SURVEY ZONE CODE
5	17	SOURCE	1	INFORMATION SOURCE
6	18	SYR	4	YEAR OF COLLECTION
7	22	SA	2	SPECIES ASSOCIATION
8	24	SP10	2	PRIMARY SPECIES #1
9	26	SP11	2	PRIMARY SPECIES #2
10	28	SP20	2	SECONDARY SPECIES #1
11	30	HGT	2	HEIGHT CLASS

12	32	D	1	DENSITY
13	33	YOO	2	YEAR OF STAND ORIGIN
14	35	SP12	2	PRIMARY SPECIES #3
15	37	SP21	2	SECONDARY SPECIES #2
16	39	U1	2	UNDERSTORY SPECIES #1
17	41	U2	2	UNDERSTORY SPECIES #2
18	43	MLEVEL	3	MANAGEMENT LEVEL CODE
19	46	YSP	4	YEAR OF SILVIC TREATMENT
20	50	R1	2	REGENERATING SPECIES #1
21	52	R2	2	REGENERATING SPECIES #2
22	54	DRAIN	3	SOIL DRAINAGE RATING
23	57	TEXT	4	SOIL TEXTURE CODE
24	61	DIST	3	DISTURBANCE TYPE
25	64	DYR	4	YEAR OF DISTURBANCE
26	68	NP	4	NONPRODUCTIVE CODE
27	72	OLDST	4	STORAGE OF NONLOCATIONAL # (FUTURE USE)

#### Forest Inventory GIS Polygon Coverage Attribute Codes

1/ MAP: The 7-digit map identifier (1347596)

2/ FID: A 4-digit stand number (9999)

3/ OWNER: The stand's ownership code, as follows:

Code	Ownership type	Code	Ownership type
----	-----	----	-----
11	Prov. Park - Historic	42	Federal Crown
12	Prov. Park - Recreation	43	National Park
13	Prov. Park - Natural Env.	51	Air Weapons Range
14	Prov. Park - Wilderness	61	Indian Reserve
15	Prov. Park - Protected	71	Regional Park
16	Prov. Park - Rec. Site	81	Provincial Crown
19	Prov. Park - Unknown	82	Provincial Reserve
21	Hamlet/Town/Village	91	Provincial Forest
22	Resort Village	92	Retained Forest Land
31	Patented Land	97	Out Of Province
41	Federal Reserve	99	Not Typed

4/ CZONE: The stand's survey zone, as follows:

Code	Survey Zone	Code	Survey Zone
----	-----	----	-----
210	Porcupine-Pasquia Hills	250	Nisbet-Wappekka Hills
211	Duck Mountain Prov. Park	260	Dore-Divide
212	Moose Mountain Prov. Park	261	Big River
220	Cumberland Lowlands	270	Peter Pond
230	Suggi Wetlands	280	Cypress Hills Prov. Park
240	Lac LaRonge - Churchill		

5/ SOURCE: Source for these stand attributes, as follows:

Code	Description
----	-----
P	SPRR - aerial photography (standard)
W	Weyerhaeuser digital (photo based)
F	SPRR - field information

6/ SYR: Source year, in 4- digit format (1976)

7/ SA: Species association, as follows:

Code	Description
----	-----
S	Pure softwood stand ( S >= 75% )
SH	Mixed softwood stand ( 75% > S > 50% )
HS	Mixed hardwood stand ( 75% > H > 50% )
H	Pure hardwood stand ( H >= 75% )

8/ SP10: Primary species #1, as follows:

Code	Softwood species	Code	Hardwood species
----	-----	----	-----
WS	White Spruce	TA	Trembling Aspen
BS	Black Spruce	BP	Black Poplar
JP	Jack Pine	WB	White Birch
BF	Balsam Fir	WE	White Elm
TL	Tamarack	GA	Green Ash
LP	Lodgepole Pine	MM	Manitoba Maple
		BO	Burr Oak

9/ SP11: Primary species #2, codes as in SP10 above

10/ SP20: Secondary species #1, codes as in SP10 above

11/ HGT: Height class code, as follows:

Code	Height Class
----	-----
5	2.5 m < HGT <= 7.5 m
10	7.5 m < HGT <= 12.5 m
15	12.5 m < HGT <= 17.5 m
20	17.5 m < HGT <= 22.5 m
25	22.5 m < HGT

12/ D: Crown closure code, as follows:

Code	Density
----	-----
A	10% < D <= 30%
B	30% < D <= 55%
C	55% < D <= 80%
D	80% < D

13/ Y00: Year of stand origin, in decadal format, as follows:

Code	Year Range	Code	Year Range
----	-----	----	-----
84	1836 - 1845	92	1916 - 1925
85	1846 - 1855	93	1926 - 1935
86	1856 - 1865	94	1936 - 1945
87	1866 - 1875	95	1946 - 1955
88	1876 - 1885	96	1956 - 1965
89	1886 - 1895	97	1966 - 1975
90	1896 - 1905	98	1976 - 1985
91	1906 - 1915	99	1986 - 1995

14/ SP12: Primary species #3, codes as in SP10

15/ SP20: Secondary species #2, codes as in SP10

16/ U1: Understory species #1, codes as in SP10

17/ U2: Understory species #2, codes as in SP10

18/ MLEVEL: Management Level, codes as follows:

Code	Management Level
----	-----
	Unmanaged or unknown (forested productive)
ANR	Assessed natural regeneration
EXP	Experimental Area
FG	Fire guard
OP	Unmanaged or unknown (nonforested productive)
PB	Prescribed Burn
PLA	Plantation
SDA	Seeded area
SIL	Silvicultural activity (archaic)
SPM	Site prepared - mechanical
SPO	Site prepared - other
SPS	Site prepared - scarification
STD	Stand tending

19/ YSP: Year of silvicultural activity (1975)

20/ R1: Regenerating species #1, as in SP10, plus codes  
GR (grassland) and SB (scrub brush)

21/ R2: Regenerating species #2, as in R1

22/ DRAIN: Soil drainage rating, coded as follows:

Code	Drainage Description
----	-----
VR	Very rapidly drained
VRR	Very rapidly - rapidly drained
R	Rapidly drained
RW	Rapidly - Well drained

W	Well drained
WM	Well - Moderately well drained
MW	Moderately well drained
MWI	Moderately well - imperfectly drained
I	Imperfectly drained
IP	Imperfectly - poorly drained
P	Poorly drained
PVP	Poorly - very poorly drained
VP	Very poorly drained

23/ TEXT: Soil texture code, as follows:

Code	Texture Description
----	-----
C	Coarse
CMC	Coarse - moderately coarse
MC	Moderately coarse
MCMF	Moderately coarse - moderately fine
MF	Moderately fine
F	Fine
O	Organic

24/ DIST: Disturbance type, as follows:

Code	Disturbance Type
----	-----
SCO	Summer cut-over
WCO	Winter cut-over
OCO	Other cut-over
SPC	Summer partial cut
WPC	Winter partial cut
OPC	Other partial cut
BO	Burn over

25/ DYR: Year of disturbance (1975)

26/ NP: Nonproductive stand code, as follows:

Code	NonProductive Type
----	-----
3100	Treed muskeg
3200	Treed rock
3300	Clear muskeg
3400	Clear rock
3500	Brushland
3600	Meadow
3700	Clearing
3800	Sand
3900	Nonproductive burn-over
4000	Pasture
5100	Flooded land
5200	Water - unknown surface
5210	Water - lake surface
5220	Water - river surface

9000 Not typed

27/ OLDST: Location to retain original 4-digit stand  
number when it is replaced by 4-digit x-y  
locational stand number. Presently empty. (9999)

File name: MISC.CODES

CODE	TYPE	DESCRIPTION	LAYER	COMMENTS
----	----	-----	-----	-----
170	ARC	NATIVE LAND ENTITLEMENT BOUNDARY	FPOLY	
211	ARC	DOUBLE SIDED RIVER SHORELINE	FPOLY	
365	ARC	SHORELINE BUFFER OUTLINE	FPOLY	
366	ARC	PROVINCIAL FOREST BUFFER OUTLINE	FPOLY	
367	ARC	INDIAN RESERVE BUFFER	FPOLY	
111	ARC	TWP/RNG GRID REFERENCE	ANNOT	FOUND OUTSIDE TILE NEATLINE
800	ARC	POINTER ARROW FOR ANNOTATION	ANNOT	USED AT DIGITIZERS DISCRETION
221	ARC	WATERCOURSE - (NONPOLY BOUNDARY)	FLINK	WAS INTERMITTENT STREAM
230	ARC	RAPIDS	FLINK	
231	ARC	FALLS	FLINK	
240	ARC	DAM	FLINK	
312	ARC	TRAIL OR CUTLINE	FLINK	
313	ARC	PORTAGE	FLINK	
314	ARC	UNVERIFIED SEISMIC LINE	FLINK	NEW CODE - DEC. 1990
320	ARC	ROAD BRIDGE	FLINK	
321	ARC	RAILROAD BRIDGE	FLINK	
340	ARC	FERRY CROSSING RIVER	FLINK	
341	ARC	FERRY CROSSING LAKE	FLINK	
350	ARC	POWER TRANSMISSION LINE	FLINK	
351	ARC	TELEPHONE LINE	FLINK	
352	ARC	OIL/GAS PIPELINE	FLINK	NEW CODE - DEC. 1990
360	ARC	AIRSTRIIP OUTLINE	FLINK	
361	ARC	CEMETERY OUTLINE	FLINK	
362	ARC	DEPRESSION OUTLINE	FLINK	DEPRESSION TO RIGHT
363	ARC	ESKER CENTERLINE	FLINK	
368	ARC	CFS/EXP. PLOT AREA OUTLINE	FLINK	
370	ARC	OUT OF STUDY WETLANDS	FLINK	INTERMITTENT SHORELINE (NTS50)
410	LABEL	FERRY CROSSING CENTER	FLINK	
412	LABEL	HISTORIC SITE	FLINK	
413	LABEL	FIRE TOWER	FLINK	
414	LABEL	OTHER TOWER	FLINK	
415	LABEL	MINE SITE	FLINK	
416	LABEL	GRAVEL PIT	FLINK	
417	LABEL	REEF OR SUBMERGED ROCK	FLINK	
418	LABEL	ROADSIDE PICNIC SITE	FLINK	
419	LABEL	SAWMILL	FLINK	
420	LABEL	OIL/GAS WELL	FLINK	SIMILAR TO MINE SITE (415)
450	LABEL	HIGHWAY ROUTE MARKER	FLINK	
500	LABEL	SMALL NONPRODUCTIVE POLYGON	FLINK	NEW CODE - OCT. 17, 1990
510	LABEL	TREED MUSKEG	FLINK	
511	LABEL	TREED ROCK SYMBOL	FLINK	
512	LABEL	CLEAR ROCK SYMBOL	FLINK	
513	LABEL	CLEAR SWAMP SYMBOL	FLINK	
514	LABEL	BRUSHLAND SYMBOL	FLINK	

515	LABEL MEADOW SYMBOL	FLINK
516	LABEL CLEARING SYMBOL	FLINK
518	LABEL PASTURE/CROP LAND SYMBOL	FLINK
520	LABEL BARN - NOT TO SCALE	FLINK 0 degrees
521	LABEL BARN - NOT TO SCALE	FLINK 22.5 degrees
522	LABEL BARN - NOT TO SCALE	FLINK 45 degrees
523	LABEL BARN - NOT TO SCALE	FLINK 67.5 degrees
524	LABEL BARN - NOT TO SCALE	FLINK 90 degrees
525	LABEL BARN - NOT TO SCALE	FLINK -67.5 degrees
526	LABEL BARN - NOT TO SCALE	FLINK -45 degrees
527	LABEL BARN - NOT TO SCALE	FLINK -22.5 degrees
530	LABEL BUILDING - NOT TO SCALE	FLINK 0 degrees
531	LABEL BUILDING - NOT TO SCALE	FLINK 22.5 degrees
532	LABEL BUILDING - NOT TO SCALE	FLINK 45 degrees
533	LABEL BUILDING - NOT TO SCALE	FLINK 67.5 degrees
9999	LABEL FOREST INVENTORY POLYGON	FPOLY UNIQUE \$ID
120	ARC PROVINCIAL BOUNDARY	FPOLY
121	ARC PROVINCIAL FOREST BOUNDARY	FPOLY PROVINCIAL FOREST TO RIGHT
122	ARC SURVEY ZONE BOUNDARY	FPOLY
123	ARC PROV. FOREST RESERVE BOUNDARY	FPOLY PARKS REC SITE ETC.
124	ARC FEDERAL CROWN BOUNDARY	FPOLY
125	ARC INDIAN RESERVE BOUNDARY	FPOLY INDIAN RESERVE TO RIGHT
127	ARC CORPORATE LIMIT BOUNDARY	FPOLY
150	ARC DRAINAGE/TEXTURE BOUNDARY	FPOLY
160	ARC FOREST COVER TYPE BOUNDARY	FPOLY
210	ARC SHORELINE	FPOLY
212	ARC LAKE/RIVER POLYGON INTERFACE	FPOLY
213	ARC RESERVOIR OR DUGOUT	FPOLY
220	ARC WATERCOURSE - (POLY BOUNDARY)	FPOLY
310	ARC PRIMARY ROAD	FPOLY
311	ARC SECONDARY ROAD	FPOLY
330	ARC RAILROAD	FPOLY
331	ARC ABANDONED RAILROAD	FPOLY
371	ARC BUILT-UP AREA OUTLINE	FPOLY
1	ARC TILE NEATLINE	SHELL SOFTWARE GENERATED
245	ARC DOCK	SPOLY ADDED MAY 3, 1990
250	ARC SAND BAR OUTLINE	SPOLY
260	ARC SAND BEACH OUTLINE	SPOLY ADDED MAY 3, 1990
364	ARC SCALE BUILDING OUTLINE	SPOLY
601	LABEL BACKGROUND POLYGON	SPOLY
610	LABEL SANDBAR IN WATER	SPOLY
612	LABEL SAND BEACH (NONPRODUCTIVE)	SPOLY ADDED MAY 2, 1990
620	LABEL SCALE BUILDING	SPOLY
110	ARC UTM GRID LINES	UTMGR SOFTWARE GENERATED

File name: DATAP.CODES

#### CODE POINT\_TYPE

-----

7000 Data Points 7000 - 7999  
 7021 Height of Land  
 7100 SPRC Controlled Data Points 7100 - 7199  
 7111 PHOTO CENTER LEADING  
 7112 PHOTO CENTER TRAILING



7113 UPDATE PHOTO CENTER LEADING  
 7114 UPDATE PHOTO CENTER TRAILING  
 7151 Provincial PSP - active  
 7152 Provincial PSP - abandoned  
 7200 CFS Controlled Data Points 7200 - 7299  
 7300 MacMillan Bloedel Controlled 7300 - 7399  
 7351 1978-81 Growth & Yield  
 7352 1978-81 Growth & Yield (abandoned)  
 7400 Weyerhaeuser Canada Controlled 7400 - 7499  
 7431 Silviculture Trials  
 7441 Mother/Super Tree (White Spruce)  
 7442 Expt. Areas / Clone Banks  
 7443 Family Trials  
 7444 Seed Production Areas  
 7451 Growth Assessment Plots (GAP)

File name: DATAP.ITEMS

POINT_TYPE	CODE	ATT	ITEMS
-----	----	---	-----
Data Points 7000 - 7999	7000		
Height of Land	7021	4I	ELEVATION
SPRC Controlled Data Points 7100 - 7199	7100		
PHOTO CENTER LEADING	7111	2C 4C 4I	YEAR FLT_LINE PHOTO_NO
PHOTO CENTER TRAILING	7112	2C 4C 4I	YEAR FLT_LINE PHOTO_NO
UPDATE PHOTO CENTER LEADING	7113	2C 4C 4I	YEAR FLT_LINE PHOTO_NO
UPDATE PHOTO CENTER TRAILING	7114	2C 4C 4I	YEAR FLT_LINE PHOTO_NO
Provincial PSP - active	7151	4I 2C	PLOT_NO SURVEY_SPECIES
Provincial PSP - abandoned	7152	4I 2C	PLOT_NO SURVEY_SPECIES
CFS Controlled Data Points 7200 - 7299	7200		
MacMillan Bloedel Controlled 7300 - 7399	7300		
1978-81 Growth & Yield	7351	4I 4I	PLOT_NO PLOT_NO
1978-81 Growth & Yield (abandoned)	7352	4I 4I	PLOT_NO PLOT_NO
Weyerhaeuser Can. Controlled 7400 - 7499	7400		
Silviculture Trials	7431	5C	PLOT_ID
Mother/Super Tree (White Spruce)	7441	3C	PLOT_ID
Expt. Areas / Clone Banks	7442	3C	PLOT_ID
Family Trials	7443	3C	PLOT_ID
Seed Production Areas	7444	3C	PLOT_ID
Growth Assessment Plots (GAP)	7451	5C	PLOT_ID

### 7.3.3 Unit of Measurement

See specific attributes described in Section 7.3.2.

### 7.3.4 Data Source

The original data were acquired as ARC/INFO coverages or export files from:

Saskatchewan Environment and Resource Management  
 Forestry Branch - Inventory Unit  
 800 Central Ave  
 Prince Albert, Saskatchewan  
 Canada S6V 6G1

### **7.3.5 Data Range**

See specific attributes described in Section 7.3.2.

### **7.4 Sample Data Record**

Not applicable.

## **8. Data Organization**

### **8.1 Data Granularity**

The smallest amount of obtainable data is one geographic block of data for the Nipawin, North of PANP, or East of PANP areas as defined in Section 7.1.1.

### **8.2 Data Format(s)**

#### **8.2.1 Uncompressed Data Files**

The data exist on tape as tar format archives of either ARC/INFO coverages or as ARC/INFO export files. There is a similar naming convention whether you are dealing with the export files or the directory structure. Export files may have file names such as l1349596.e00 for the linear layer or p1349596.e00 for the polygon layer, whereas with the directory structure you will find a directory name such as z1349596 with FPOLY and link subdirectories (for polygon and linear layers, respectively). There may be additional subdirectories for those blocks containing several layers. The 1349596 number refers to the UTM 10-km x 10-km block, where 13 refers to the UTM zone, 49 refers to the lower left corner of the 10,000-m UTM block easting (e.g., 490,000), and 596 refers to the lower left corner of the 10,000-m UTM block northing (e.g., 5,960,000).

The Nipawin data block is written as a tar archive of the ARC/INFO directory structure of all 129 map tiles, with 7 separate layers (coverages) per map and containing all the associated ARC/INFO files for each coverage. This ends up being well over 100 files per map or tile; therefore, it is recommended that the tar file contents be listed before being extracted.

The East of PANP data block is written as a tar archive of the linear and polygon layer export files for the 27 map block adjacent to PANP and one additional polygon layer near PANP that contains the Nesbit forest.

The North of PANP data block is also written as a tar archive of the ARC/INFO directory structure of the 20 map tiles within it and 7 layers per map tile. Restoring this archive will create the ARC/INFO directory structures as they appeared on the original system, and they will be ready for use without importing as with the Nipawin block. It is also recommended with this data set that the tar file is listed before it is extracted.

#### **8.2.2 Compressed CD-ROM Files**

On the BOREAS CD-ROMs, each of the files listed above has been compressed with the Gzip compression program (file name \*.gz). These data have been compressed using gzip version 1.2.4 and the high compression (-9) option (Copyright (C) 1992-1993 Jean-loup Gailly). Gzip (GNU zip) uses the Lempel-Ziv algorithm (Welch, 1994) used in the zip and PKZIP programs. The compressed files may be uncompressed using gzip (-d option) or gunzip. Gzip is available from many Web sites (for example, ftp site prep.ai.mit.edu/pub/gnu/gzip-\*.\*) for a variety of operating systems in both executable and source code form. Versions of the decompression software for various systems are included on the CD-ROMs.

## **9. Data Manipulations**

### **9.1 Formulae**

None.

#### **9.1.1 Derivation Techniques and Algorithms**

None.

### **9.2 Data Processing Sequence**

#### **9.2.1 Processing Steps**

BORIS staff copied and compressed the files for release on CD-ROM.

#### **9.2.2 Processing Changes**

None.

### **9.3 Calculations**

#### **9.3.1 Special Corrections/Adjustments**

Note that in the coverages there is a y-shift of 6,000,000 (presumably to save storage space). To get correct UTM northing coordinates, add 6,000,000 to each of the existing coordinates. This shift needs to be handled properly when performing spatial transformations or reprojections of the data. If using ARC/INFO, you may wish to run the PROJECTDEFINE function.

#### **9.3.2 Calculated Variables**

None.

### **9.4 Graphs and Plots**

None.

## **10. Errors**

### **10.1 Sources of Error**

There is the possibility of coding errors in the attributes, transcription errors from original sample data, and photo-interpretation errors.

### **10.2 Quality Assessment**

#### **10.2.1 Data Validation by Source**

Unknown.

#### **10.2.2 Confidence Level/Accuracy Judgment**

No information is known about the procedures and equipment used to create these data. Within the bounds of what BORIS staff know about the data, the data are of good quality.

#### **10.2.3 Measurement Error for Parameters**

Unknown.

#### **10.2.4 Additional Quality Assessments**

None.

### **10.2.5 Data Verification by Data Center**

BORIS staff members have unpacked and worked with many but not all of the tiles in the three geographic blocks. No problems were encountered in any of the tiles processed.

## **11. Notes**

### **11.1 Limitations of the Data**

BORIS acquired these data in 1993; therefore, areas subjected to logging activity or other disturbance, such as fire, will appear much different today as compared to the forest cover data.

### **11.2 Known Problems with the Data**

None.

### **11.3 Usage Guidance**

Saskatchewan Parks and Renewable Resources does not accept any liability for decisions action taken on the basis of these data.

Before uncompressing the Gzip files on CD-ROM, be sure that you have enough disk space to hold the uncompressed data files. Then use the appropriate decompression program provided on the CD-ROM for your specific system.

### **11.4 Other Relevant Information**

Saskatchewan Parks and Renewable Resources also maintains stand and stock tables and possibly some permanent sample plots in this area. Aerial photographic prints and negatives are also available. Contact the agency directly if you are interested in such information or if you wish to acquire these data.

## **12. Application of the Data Set**

This data set would provide good reference information for assessing spectral image data classification techniques over the area and serve as an initial baseline data set for analyzing land cover and vegetation change.

## **13. Future Modifications and Plans**

None.

## **14. Software**

### **14.1 Software Description**

The Environmental Systems Research Institute (ESRI) ARC/INFO (Version 7.0) package was used to perform the data manipulation and processing. Questions about the software should be directed ESRI. Gzip (GNU zip) uses the Lempel-Ziv algorithm (Welch, 1994) used in the zip and PKZIP commands.

## **14.2 Software Access**

ARC/INFO is proprietary software with copyright protection. Contact ESRI for details:

Environmental Systems Research Institute, Inc. (ESRI)  
380 New York St.  
Redlands, CA 92373-8100

Gzip is available from many Web sites across the Internet (for example, ftp site [prep.ai.mit.edu/pub/gnu/gzip-\\*.\\*\)](http://prep.ai.mit.edu/pub/gnu/gzip-*.*)) for a variety of operating systems in both executable and source code form. Versions of the decompression software for various systems are included on the CD-ROMs.

## **15. Data Access**

The SERM forest cover data layers of the SSA in vector format are available from the Earth Observing System Data and Information System (EOSDIS) Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

### **15.1 Contact Information**

For BOREAS data and documentation please contact:

ORNL DAAC User Services  
Oak Ridge National Laboratory  
P.O. Box 2008 MS-6407  
Oak Ridge, TN 37831-6407  
Phone: (423) 241-3952  
Fax: (423) 574-4665  
E-mail: [ornldaac@ornl.gov](mailto:ornldaac@ornl.gov) or [ornl@eos.nasa.gov](mailto:ornl@eos.nasa.gov)

### **15.2 Data Center Identification**

Earth Observing System Data and Information System (EOSDIS) Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC) for Biogeochemical Dynamics  
<http://www-eosdis.ornl.gov/>.

### **15.3 Procedures for Obtaining Data**

Users may obtain data directly through the ORNL DAAC online search and order system [<http://www-eosdis.ornl.gov/>] and the anonymous FTP site [<ftp://www-eosdis.ornl.gov/data/>] or by contacting User Services by electronic mail, telephone, fax, letter, or personal visit using the contact information in Section 15.1.

### **15.4 Data Center Status/Plans**

The ORNL DAAC is the primary source for BOREAS field measurement, image, GIS, and hardcopy data products. The BOREAS CD-ROM and data referenced or listed in inventories on the CD-ROM are available from the ORNL DAAC.

## **16. Output Products and Availability**

### **16.1 Tape Products**

The data can be made available on 8-mm, Digital Archive Tape (DAT), or 9-track tapes at 1600 or 6250 Bytes Per Inch (BPI).

## **16.2 Film Products**

None available from BORIS. See Other Relevant Information, Section 11.4.

## **16.3 Other Products**

These data are available on the BOREAS CD-ROM series.

# **17. References**

## **17.1 Platform/Sensor/Instrument/Data Processing Documentation**

ARC/INFO User's Guide (Version 7). 1994. Redlands, CA.

Welch, T.A. 1984. A Technique for High Performance Data Compression. IEEE Computer, Vol. 17, No. 6, pp. 8-19.

## **17.2 Journal Articles and Study Reports**

Lindenau, D.G. June 1985. Forest Inventory Interpretation and Mapping Manual - Specifications for the Interpretation and Mapping of Aerial Photographs in the Forest Inventory Section. Saskatchewan Parks and Renewable Resources.

Newcomer, J., D. Landis, S. Conrad, S. Curd, K. Huemmrich, D. Knapp, A. Morrell, J. Nickeson, A. Papagno, D. Rinker, R. Strub, T. Twine, F. Hall, and P. Sellers, eds. 2000. Collected Data of The Boreal Ecosystem-Atmosphere Study. NASA. CD-ROM.

Sellers, P. and F. Hall. 1994. Boreal Ecosystem-Atmosphere Study: Experiment Plan. Version 1994-3.0, NASA BOREAS Report (EXPLAN 94).

Sellers, P. and F. Hall. 1996. Boreal Ecosystem-Atmosphere Study: Experiment Plan. Version 1996-2.0, NASA BOREAS Report (EXPLAN 96).

Sellers, P., F. Hall, and K.F. Huemmrich. 1996. Boreal Ecosystem-Atmosphere Study: 1994 Operations. NASA BOREAS Report (OPS DOC 94).

Sellers, P., F. Hall, and K.F. Huemmrich. 1997. Boreal Ecosystem-Atmosphere Study: 1996 Operations. NASA BOREAS Report (OPS DOC 96).

Sellers, P., F. Hall, H. Margolis, B. Kelly, D. Baldocchi, G. den Hartog, J. Cihlar, M.G. Ryan, B. Goodison, P. Crill, K.J. Ranson, D. Lettenmaier, and D.E. Wickland. 1995. The boreal ecosystem-atmosphere study (BOREAS): an overview and early results from the 1994 field year. Bulletin of the American Meteorological Society. 76(9):1549-1577.

Sellers, P.J., F.G. Hall, R.D. Kelly, A. Black, D. Baldocchi, J. Berry, M. Ryan, K.J. Ranson, P.M. Crill, D.P. Lettenmaier, H. Margolis, J. Cihlar, J. Newcomer, D. Fitzjarrald, P.G. Jarvis, S.T. Gower, D. Halliwell, D. Williams, B. Goodison, D.E. Wickland, and F.E. Guertin. 1997. BOREAS in 1997: Experiment Overview, Scientific Results and Future Directions. Journal of Geophysical Research 102 (D24): 28,731-28,770.

## **17.3 Archive/DBMS Usage Documentation**

None.

# **18. Glossary of Terms**

None.

## 19. List of Acronyms

ASCII	- American Standard Code for Information Interchange
BOREAS	- BOReal Ecosystem-Atmosphere Study
BORIS	- BOREAS Information System
BPI	- Bytes Per Inch
CD-ROM	- Compact Disk - Read-Only Memory
DAAC	- Distributed Active Archive Center
DAT	- Digital Archive Tape
EOS	- Earth Observing System
EOSDIS	- EOS Data and Information System
GAP	- Growth Assessment Plots
GIS	- Geographic Information System
GSFC	- Goddard Space Flight Center
MSA	- Modeling Sub-Area
NAD27	- North American Datum of 1927
NASA	- National Aeronautics and Space Administration
NSA	- Northern Study Area
ORNL	- Oak Ridge National Laboratory
PANP	- Prince Albert National Park
SERM	- Saskatchewan Environment and Resource Management
SERM-FBIU	- SERM-Forestry Branch Inventory Unit
SSA	- Southern Study Area
URL	- Uniform Resource Locator (a World Wide Web address)
UTM	- Universal Transverse Mercator

## 20. Document Information

### 20.1 Document Revision Dates

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Last Updated: 03-Feb-1999

### 20.2 Document Review Dates

BORIS Review: 15-May-1997

Science Review:

### 20.3 Document ID

### 20.4 Citation

When using these data, please include the following acknowledgment as well as citations of relevant papers in Section 17.2:

The original data were provided by SERM-FBIU. The vector data were processed and gridded by BORIS staff. The contribution of the vector data by SERM and the processing of the data by BORIS staff are greatly appreciated.

If using data from the BOREAS CD-ROM series, also reference the data as:

BOREAS Staff Science, "BOREAS Staff Science GIS Data Collection Program." In Collected Data of The Boreal Ecosystem-Atmosphere Study. Eds. J. Newcomer, D. Landis, S. Conrad, S. Curd, K. Huemmrich, D. Knapp, A. Morrell, J. Nickeson, A. Papagno, D. Rinker, R. Strub, T. Twine, F. Hall, and P. Sellers. CD-ROM. NASA, 2000.

Also, cite the BOREAS CD-ROM set as:

Newcomer, J., D. Landis, S. Conrad, S. Curd, K. Huemmrich, D. Knapp, A. Morrell, J. Nickeson, A. Papagno, D. Rinker, R. Strub, T. Twine, F. Hall, and P. Sellers, eds. Collected Data of The Boreal Ecosystem-Atmosphere Study. NASA. CD-ROM. NASA, 2000.

## **20.5 Document Curator**

## **20.6 Document URL**



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